

TILLAEA AQUATICA L., 17584. This interesting little plant has escaped detection in Minnesota until now. According to the reported range for North America, our collection is a new record for both Minnesota and the Great Plains Region of the United States and Canada.

ELATINE TRIANDRA Schkuhr f. TERRESTRIS Seubert, 17585. The terrestrial form in drying mud is new to Minnesota.

HYDRANTHELIUM ROTUNDIFOLIUM (Michx.) Pennell, 17579. This species is also known from Lac qui Parle County where it was collected by Moyer and from Lyon County where it was collected by N. L. Huff.

LIMOSELLA AQUATICA L., 17581.

PLANTAGO ELONGATA Pursh, 17587. We are reporting this species from Minnesota for the first time, although there is one previous specimen preserved in the Herbarium: Pipestone, Pipestone County, June 15, 1931, *Fellows*.

The following species were collected at the same locality in the adjacent prairie: *Stipa spartea* Trin., 17574; *Hordeum jubatum* L., 17583; *Anemone canadensis* L., 17570; *Lepidium densiflorum* Schrad., 17571; *Rosa arkansana* Porter, 17572; *Scutellaria parvula* Michx., 17573; *Acerates lanuginosa* (Nutt.) Dcne., 17568; *Verbena simplex* Lehm., 17580; *Erigeron strigosus* Muhl. ex Willd., 17569; *Achillea lanulosa* Nutt., 17577.

Department of Botany,

UNIVERSITY OF MINNESOTA, Minneapolis.

---

## NOTES ON THE COMPOSITAE OF THE NORTHEASTERN UNITED STATES

### III. INULEAE AND SENECEIONEAE

ARTHUR CRONQUIST

My condensation of the Antennarias of the northeastern United States (RHODORA 47: 182-184. 1945) has been criticized at some length by Fernald (RHODORA 47: 221-235; 239-247. 1945). At the root of the trouble in *Antennaria* is the problem of apomixis. Some workers, especially those in Europe, have contended that each apomict should be treated as a distinct species, since it is self-perpetuating, and can, at least theoretically, be differentiated from all other apomicts by morphological minutiae. There are three noteworthy objections to such a pro-



cedure. First, it represents a radical departure from the traditional concept of a species, ill-defined though that concept may be. Second, even in apomictic groups, apomixis is not always obligatory. Occasional normal sexual reproduction may occur, or, in some part of the range, be quite common. Fernald has admitted this to be true in *Antennaria*. These sexually reproducing plants may transcend the variation of several apomictic races, as has been demonstrated in *Crepis acuminata* by Babcock and Stebbins. One is then faced with the choice between distinguishing as separate species the normally variable offspring of the sexual plants, or using apomixis itself as a specific criterion. Few botanists would defend either procedure, in theory. Third, the number of apomictic races may be so great that in practice it becomes impossible to distinguish them clearly. In a hypothetical case of completely obligatory apomixis, there is no doubt that apomict a and apomict z are readily distinguishable, even though they may occur in the same area. Apomicts d, g, o, and s, as they are successively discovered and studied, are likewise distinguishable, although the differences between them are not so great as between a and z. But when apomicts a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, and z have been discovered and named, a wholly confluent series is formed. Having once started splitting, the worker must either continue to describe new species ad infinitum, or undo his previous work on the group. The latter rarely happens. It is apt to take a relative new-comer, with an unbiased viewpoint and no axes to grind, to plunge into things and restore some degree of sanity to the situation.

The alternative to treating each apomict as a separate species is to group them, insofar as possible, into units comparable in taxonomic significance, variability, and clarity of definition, with the ordinary sexual species. The principal difficulty here is that the normal specific lines may be obscured by the persistence, as apomictic races, of the occasional interspecific hybrids. It may then become necessary to admit more than the usual amount of intergradation between species, in order to obtain units otherwise comparable to the strictly sexual species. A recent treatment embodying this alternative approach is that of *Crepis* by Babcock and Stebbins. After the most intensive and thorough study



that has yet been given to a large American genus, these authors concluded that the only practical systematic approach was to admit the existence of numerous more or less distinguishable apomicts within a single species, while also admitting an unusual amount of intergradation between species.

In considering the Antennarias of the manual range, I was unable to distinguish consistently and with reasonable certainty the great mass of recent segregates. The characters, as shown by our specimens, are just not as constant as has been claimed. I therefore found it necessary to prepare a new and more conservative treatment. Although monographic study, making use of the material from all the major herbaria (which is beyond the scope of any floristic treatment) might conceivably warrant certain adjustments in my treatment of varieties, I am convinced that the entities considered do properly fall into only three well-founded and reasonably distinct species. The concluding paragraph of Stebbins' reply (RHODORA 38: 367-369. 1936) to Fernald's reduction of *A. virginica* and its variety *argillicola* to varietal status under *A. neodioica* is wholly pertinent: "I recognize that there is overlapping between *A. virginica* and *A. neodioica* in some characteristics, but since I am aware of an equal amount of overlapping between *A. fallax* and *A. Parlinii* (particularly in the southern and western portions of their range), *A. neglecta* and *A. petaloidea* (chiefly in Wisconsin), *A. petaloidea* and *A. neodioica* (throughout the north central states), and *A. Parlinii* and *A. Brainerdii* (in central New York) I feel that, in the interests of consistency, the reduction of *A. virginica* to a variety calls for a similar reduction of *A. Parlinii*, *A. petaloidea*, *A. Brainerdii*, and probably other species now recognized in the floras of eastern North America."

It is my opinion that the first opinion expressed by Fernald regarding the validity of *A. virginica* is correct, and that Stebbins' subsequent comments are wholly justified. Stebbins' indication of the particular areas in which intergradation is most noticeable is of particular significance. It cannot be too strongly emphasized that apparently constant differences in one locality may be broken down completely in some area, if apomixis is involved. The plants which break down the differences between two otherwise well-characterized apomicts may be still other apomicts



(since potentially there is an apomict for every genotype) or they may be sexually reproducing plants showing the normal variability involved in cross-breeding. In either case the result is the same: differences which appear constant in one restricted area may vanish in some other area. With apomictic groups, even more than with sexual groups, therefore, the whole range of variability of the species, throughout its whole geographic distribution, should be considered before any program of segregation is initiated.

There are, however, some valid criticisms in Dr. Fernald's paper. I overlooked the existence on the Gaspé peninsula of two boreal and cordilleran species, *A. alpina* (L.) Gaertn. and *A. umbrinella* Rydb. These are the species which he reports as *A. vexillifera* and *A. subviscosa*, respectively. *A. vexillifera* Fern. is merely one of a host of recent segregates from *A. alpina* (L.) Gaertn., a highly variable circumpolar species. Doubtless several varieties should be recognized, but their taxonomy and nomenclature are yet far from clear. For the present I think it best to associate *A. vexillifera* Fern. with *A. alpina* (L.) Gaertn. var. *canescens* Lange.

*Antennaria subviscosa* Fern. appears to me to be identical with the northern and western *A. umbrinella* Rydb. This species is interesting in that it shows the most ideal transition, sometimes even on the same head, between the contrasting phyllary-types of the *A. alpina* group and the *A. dioica* group (including *A. neglecta*, *A. plantaginifolia*, *A. parvifolia*, *A. microphylla*, and others). In the former the cellular structure of the scarious part of the phyllary is more or less evident under 25 diameters magnification, and the pigment (varying from dirty green to brownish or nearly black) is in the cell walls. In the latter the cells are laterally compressed so that their raised walls are closely parallel and give the phyllary-tip a finely striate appearance, and the pigment, if any (mostly whitish or pink), is diffuse. Most of the western specimens of *A. umbrinella* have glabrous achenes, but *Hitchcock and Martin 5600*, from Nye County, Nevada, recently so determined by Dr. S. F. Blake, has them papillate, as in *A. subviscosa*. Since apparently no other characters are associated with it, papillosity of the achenes would seem to fail in this case as a specific criterion.



Two collections from the same station in western Minnesota form the basis for Dr. Fernald's inclusion of *A. aprica* Greene in the manual range. I concur in the identification of the specimens, which mark the eastern limit of the known range of the species. Unfortunately the name *A. parvifolia* Nutt. antedates *A. aprica* Greene and applies to the same species. This was pointed out to me recently by Dr. Blake, and I confirmed it by examining Nuttall's isotype at Philadelphia.<sup>1</sup> Of more than 30 specimens of *A. parvifolia* examined for achaenial papillae, about half were seen to be papillate at 25 diameters magnification, a few which seemed glabrous at 25 diameters were seen to be sparsely and minutely papillate when examined at 50 diameters, and the rest were apparently glabrous even at 50 diameters. In some cases specimens of the same collection, looking very

<sup>1</sup> Dr. Fernald informs me that Nuttall's material of *Antennaria parvifolia* at the British Museum contains plants of *A. rosea* Greene and *A. microphylla* Rydb., as well as *A. aprica* Greene, and suggests a need for further clarification. (It is my present opinion that *A. microphylla*, *A. rosea*, and a number of other western segregates properly constitute a single polymorphic species, but these names are here used in the more restricted sense.) In accordance with Article 52 of the Rules, it becomes necessary to settle upon one of these as the basic element of *A. parvifolia*, to which the name should be restricted. Both *A. microphylla* and *A. rosea* may be excluded on the basis of Nuttall's description. The leaves of *A. microphylla* rarely exceed 1 cm. in length, and are certainly not "half or three-quarters of an inch long . . . [and] somewhat rhomboidally spathulate". *A. rosea*, on the other hand, occasionally has leaves as large as those described by Nuttall, but may be excluded by its pink phyllaries. In the diagnosis of the species Nuttall says that the involucre bracts are yellow. In the more general discussion he says in one place that they are yellow, and in another that they are purple. Obviously here the two color-types are being included in the same species; just as obviously, the pink (or purple) type must be considered a subordinate element, since it is mentioned only in the general discussion and is definitely excluded by the preliminary diagnosis. It should further be noted that occasional otherwise representative specimens of *A. aprica* have a distinct pink cast to the phyllaries, but it is to be assumed that the part of the type-collection of *A. parvifolia* which Dr. Fernald refers to *A. rosea* is not of this nature. One further difficulty remains: both *A. microphylla* and *A. aprica* have white rather than yellow phyllaries. Either of these, particularly *A. aprica*, may develop a yellowish tint in drying, however, and it must be remembered that the drying equipment available to Nuttall was not up to present-day standards. Both *A. microphylla* and *A. rosea* reach the edge of their range in the vicinity of the type-locality of *A. parvifolia* ("On the Black Hills and plains of the upper part of the Platte"), and are there uncommon. *A. aprica*, however, abounds in that region. Except as noted above, Nuttall's description and comments apply very well to *A. aprica* Greene; one of the two exceptions may be explained by inadequate means of drying specimens, and the other by the inclusion of a definitely subordinate element (*A. rosea*) with the more characteristic specimens. Certainly Nuttall's description and comments are more applicable as a whole to *A. aprica* than to either *A. rosea* or *A. microphylla*. It therefore seems plain that the name *Antennaria parvifolia* Nutt. should properly be applied to that part of Nuttall's type which has pale phyllaries and comparatively large leaves (these leaves, incidentally, being much smaller than those of the common eastern species). This part is conspecific with *A. aprica* Greene, which is therefore reduced to synonymy.



much alike superficially, varied from apparently glabrous to evidently papillate. Although papillosity of the achenes is doubtless valuable in some cases as a taxonomic character, it seems that Mr. Porsild and Dr. Fernald have overestimated its importance. Linnaeus' maxim, "Characterem non constituere Genus, sed Genus characterem", is equally true of species.

In conclusion, the species of *Antennaria* known to occur in northeastern United States and the portion of adjacent Canada south of the St. Lawrence River, as I understand them, may be keyed as follows:

1. Involucral bracts brown or dirty blackish green throughout: leaves about 1.5–5 mm. wide; Gaspé, Que., and northward. . . . . *A. alpina*.
1. Involucral bracts (at least the inner) white or whitish toward the tip; leaves often much larger.
  2. Upper surface of the leaves nearly or quite as densely hairy as the lower, glabrate, if at all, only in extreme age; Gaspé, Que., and northward; w. Minn. and westward.
  3. Pistillate involucre mostly 5–7 mm. high; terminal scarious portion of the outer involucral bracts more or less discolored and brownish; Gaspé, Que., and northward. . . . . *A. umbrinella*.
  3. Pistillate involucre mostly 8–11 mm. high; terminal scarious portion of the outer bracts, as well as the inner, white (or occasionally becoming yellowish in drying) and shining; w. Minn. and westward. . . . . *A. parvifolia*.
2. Upper surface of the basal leaves distinctly less pubescent than the lower, sooner or later glabrate; throughout our range (*A. solitaria* toward the south only).
  3. Basal leaves and those at the ends of the stolons relatively small, less than 1.5 cm. wide, 1-nerved or obscurely 3-nerved. . . . . *A. neglecta*.
  3. Basal leaves and those at the ends of the stolons relatively large, prominently 3–5-nerved, the larger ones 1.5 cm. wide or more.
    4. Heads several. . . . . *A. plantaginifolia*.
    4. Heads solitary. . . . . *A. solitaria*.

GNAPHALIUM PURPUREUM L. var. **purpureum**, var. nov. *Gnaphalium purpureum* L. Sp. Pl. 854. 1753, sens. strict.

*Gnaphalium saxicola* Fassett is as yet known from only a very few collections in Wisconsin, but is approached by occasional specimens from elsewhere in the range of *G. obtusifolium*. At least until a larger series of specimens demonstrates its morphologic and genetic discontinuity, it seems better treated as a variety of *G. obtusifolium*.

GNAPHALIUM OBTUSIFOLIUM L. var. **saxicola** (Fassett), comb. nov. *Gnaphalium saxicola* Fassett, RHODORA 33: 75. 1931.



*Erechtites megalocarpa* Fern. was described from saline coastal marshes in Massachusetts. It has subsequently been reported from Rhode Island and Long Island, and specimens in the local herbarium of the New York Botanical Garden extend the known range to Ocean County, New Jersey. It differs from *E. hieraciifolia* (L.) Raf. in its fleshiness, broader heads, and larger achenes with more numerous nerves, as well as some minor and inconstant tendencies or trends. The succulence is not preserved in the herbarium, and dried specimens of the two are superficially very similar. The several technical differences would at first seem to be of specific importance, but a study of our material shows no real discontinuity. In this connection, it is interesting to note that Millspaugh and Chase (Field Mus. Pub. Bot. 3: 146. 1904) describe the Yucatan plants of *E. hieraciifolia* as having achenes up to 3.8 mm. long, although Fernald, in noting the large achenes (4–5.5 mm.) of *E. megalocarpa* indicates that those of *E. hieraciifolia* are only 2–3 mm. long. It seems reasonable, therefore, to treat *E. megalocarpa* as merely a well-marked ecotype of saline coastal marshes.

ERECTITES HIERACIIFOLIA (L.) Raf. var. **megalocarpa** (Fern.), comb. nov. *E. megalocarpa* Fern. RHODORA 19: 24. 1917.

In trying to determine the differences between *Petasites palmatus* (Ait.) Gray and *P. vitifolius* Greene I was led into a general consideration of the *P. frigidus* group, to which they belong. The principal differences which have been used for taxonomic segregation within the group are in the size, shape, and lobing of the leaves, but it soon became apparent that these differences, while striking, are far from constant. The differences adduced by Rydberg in the relative lengths of the throat and teeth of the corollas of the perfect flowers are unstable and apparently wholly without taxonomic value.

It is my opinion that only two closely related species should be recognized in this group, namely *P. frigidus* Fries and *P. sagittatus* (Banks) Gray. Both species are variable, rendering a simple and concise statement of their differences most difficult. The leaves of *P. sagittatus* vary from merely a little wavy and callous-denticulate (especially in smaller specimens) to more commonly conspicuously dentate with 20–35 teeth on each side. Those of *P. frigidus*, on the other hand, vary from coarsely toothed, with



5–15 teeth on each side (in smaller forms), to more or less distinctly lobed (in larger forms), and then often with more numerous teeth. The venation, toothing, and lobing of *P. frigidus* is pinnipalmate in small forms, becoming progressively more strongly palmate in larger ones; in *P. sagittatus* the venation is pinnipalmate throughout, the leaves often becoming conspicuously longer than broad. These differences, while seemingly weak, are in practice sufficiently constant to leave very few if any doubtful specimens, and the two species can generally be distinguished at a glance.

The appearance of *P. sagittatus* is sufficiently characteristic so that only one segregate, *P. dentatus* Blankinship, has been proposed. This was reduced by Rydberg in the North American Flora. The extremes of variation in *P. frigidus*, on the other hand, seem so different that nearly a dozen segregates have been proposed. These rest almost entirely on foliar characters, however, and are seen to be confluent when a large series of specimens is examined. The facts were seen in their proper perspective as long ago as 1865, when Herder recognized two American and one European variety of *P. frigidus*, in addition to the circumpolar typical one. His summary of the situation is worthy of quotation: "Diese hoch-nordische Pflanze zeigt eine grosse Verschiedenheit in der Configuration und Zahnung ihrer Blätter, so dass, wenn man nur einzelne Exemplare aus einer Gegend hat, man leicht in den Fall kommt, auf ihre oft eigenthümliche Blattgestaltung hin, Arten zu gründen." It remains only to transfer his names from the segregate genus *Nardosmia* to *Petasites* and refer the more recent names to their proper places.

PETASITES FRIGIDUS (L.) Fries var. **genuinus** (Herder), comb. nov. *Nardosmia frigida* var. *genuina* Herder, Bull. Soc. Nat. Mosc. 1865: 372. *Petasites gracilis* Britton, Bull. N. Y. Bot. Gard. 2: 186. 1901. *P. alaskanus* Rydb. N. Am. Fl. 34 (4): 314. 1927. *P. Warrenii* St. John, Res. Stud. State Coll. Wash. 1: 109. 1929. Leaves relatively small, pinnipalmately veined, coarsely and irregularly toothed, but only scarcely or obscurely lobed.

PETASITES FRIGIDUS (L.) Fries var. **corymbosus** (R. Br.), comb. nov. *Tussilago corymbosa* R. Br.<sup>1</sup> App. Parry's First Voy.

<sup>1</sup> Dr. Fernald in personal correspondence has raised a question as to the identity of *Tussilago corymbosa* R. Br. The original description is clear enough, noting that the leaf-lobes are equal to  $\frac{1}{3}$  to  $\frac{1}{2}$  of the "radius" of the leaf, and are themselves toothed,



279. 1824. *Nardosmia corymbosa* Hook. Fl. Bor.-Am. **1**: 307. 1833. *Nardosmia frigida* var. *corymbosa* Herder, Bull. Soc. Nat. Mosc. 1865: 372. *Petasites trigonophyllus* Greene, Leaf. **1**: 180. 1906. *P. vitifolius* Greene, loc. cit. *P. nivalis* Greene, Pitt. **2**: 18. 1889. *P. corymbosus* Rydb. Bull. Torrey Club **37**: 460. 1910. *P. hyperboreus* Rydb. N. Am. Fl. **34** (4): 312. 1927. *P. frigidus* var. *hyperboreoides* Hulten, Fl. Aleutian Isl. 328. 1937. Leaves mostly pinnipalmate, distinctly lobed, the lobes seldom extending more than half way to the base.

PETASITES FRIGIDUS (L.) Fries var. **palmatus** (Ait.), comb. nov. *Tussilago palmata* Ait. Hort. Kew. **3**: 188. 1789. *Nardosmia palmata* Hook. Fl. Bor.-Am. **1**: 308. 1833. *Nardosmia Hookeriana* Nutt. Trans. Am. Phil. Soc. II. **7**: 288. 1841. *Nardosmia frigida* var. *palmata* Herder, Bull. Soc. Nat. Mosc. 1865: 372. *Nardosmia speciosa* Nutt. Trans. Am. Phil. Soc. II. **7**: 288. 1841. *Petasites palmatus* var. *frigidus* Macoun, Cat. Can. Pl. **1**: 553. 1886. *Petasites speciosus* Piper, Mazama **2**: 97. 1901. *Petasites speciosus* var. *frigidus* Henry, Fl. S. Br. Columb. 311. 1915. *P. Hookerianus* Rydb. N. Am. Fl. **34** (4): 314. 1927. Leaves distinctly palmate, the lobes generally extending more than half way to the base.

---

the teeth mucronulate. The leaf size given, 1 ½-2 ½ inches broad, is within the range of normal variation of the entity to which Hooker, Herder and I have successively attached the name, although many of the more southern specimens, in particular, are often much larger. A photograph at the Gray Herbarium of some fragments in the British Museum which are supposed to represent type material collected by Captain Sabine on Melville Island shows a plant similar in size, habit, and general characteristics to what has been assumed to be an isotype in the Gray Herbarium, the two being apparently of the same collection. Both of these differ from Brown's description, however, not only in the smaller leaves (barely 3 cm. wide in the Gray Herbarium specimen, apparently even narrower in the other), but also in having the leaves merely toothed, and seem to represent the typical phase of *P. frigidus* as understood by me. The flowering stalks do have the corymbiform inflorescence described by Brown (a character now generally conceded to be of no taxonomic value here), but in neither specimen is the accompanying basal leaf organically attached to the flowering stem. In the Flora Boreali-Americana Hooker distinguishes *Nardosmia corymbosa* (based on *Tussilago corymbosa* R. Br.) from *N. frigida* solely on its leaf-outline, and cites specimens by Parry, Sabine, and Richardson. Since Brown was describing plants collected on the Parry expedition as well as the Sabine expedition, the name may well have been founded partly or even wholly on the Parry collection. On the basis of Brown's clear and explicit description, in which he specifically contrasted the leaves of *T. corymbosa* with those of *T. frigida*, I find it difficult to believe that the specimen in the Gray Herbarium, or the specimen which Dr. Fernald has photographed in the British Museum is authentic material of *T. corymbosa*. There may have been an error in the labeling or the mounting, or the Sabine collection may have been mixed, since *Petasites frigidus* is certainly to be expected on Melville Island. In any case, the basal leaves accompanying the specimens mentioned at the Gray Herbarium and the British Museum can scarcely be considered to form part of the true type of *Tussilago corymbosa* R. Br. Under the circumstances, and especially since he evidently had authentic material at his disposal, I think it proper to continue Hooker's interpretation of the name.



As might be expected, the species increases progressively in size with amelioration of the habitat, so that var. *genuinus* is the most reduced, and the var. *palmatus* averages the largest. *P. speciosus*, of the Pacific coastal states, has the leaves a little less deeply lobed, on the average, than do the ordinary forms of the transcontinental *P. palmatus*, but the differences are slight and inconstant, and many specimens are quite indistinguishable.

More collections are needed before the precise limits of range of each variety may be defined. In general, the var. *genuinus* is the most boreal of the three, and the only circumpolar one. It is known to extend south in the high mountains to Washington. The var. *corymbosus* is found through much of the American range of var. *genuinus*, but extends farther south, reaching Gaspé, Que., Mich., and Minn. The var. *palmatus* is the most southern of the three, extending as far as Mass., on the east coast, and Calif., on the west.

NEW YORK BOTANICAL GARDEN  
New York, N. Y.

---

## AMELANCHIER SPICATA NOT AN AMERICAN SPECIES

M. L. FERNALD

(Plates 1027–1030)

The name *Amelanchier spicata* (Lam.) K. Koch has dodged in and out of American treatments of the genus but was supposed to have been finally dismissed by Wiegand in his critical studies of the genus, when he wrote in RHODORA, xiv. 123 (1912):

Those who have seen these specimens and the type specimen of *Crataegus spicata* [of Lamarck, basis of *A. spicata*], as well as specimens of our Eastern American stoloniferous fine-toothed *Amelanchier* agree that they all appear to be one and the same thing. Flowers and leaves in the exsiccatæ match those of this stoloniferous species as well as one could wish, as do also the flowers and leaves in the original descriptions. The original description of *C. spicata*, however, gives the height of the plant as from two to three times that of the native European species of *Amelanchier*, which, figured out, would mean about 2–5 m. [ $6\frac{3}{4}$ – $16\frac{9}{10}$  feet]. Willdenow gives the height as 2–2.5 m. In addition, Mr. Alfred Rehder has stated to the writer that the plant in European gardens commonly passing under the name *A. ovalis* [*A. ovalis* sensu Borkh., equaling *A. spicata*, not *A. ovalis* Medicus, the native European species] is not low and stoloniferous but tall and fastigate.